WHAT IS CLAIMED IS:

1. A network over which a medium is transferred comprising: S core rings, each said core ring of which can be modeled as a set of nodes interconnected by links, where S is greater than or equal to 4 and is an integer, each said core ring having at least N nodes, where N is greater than or equal to 4 and is an integer, each node/link configurable in terms of directing the medium from a given source toward a given destination, and where each of the core rings is directly connected by means of k spanning links, where k is greater than or equal to 2, so as to comprise a spanning ring to at least a second and a third of the other core rings, and where the combinations of core rings spanned by each core ring is such that there is a path comprised of links and nodes from each node on any core ring to any other node on any other core ring.

2. A network as described in Claim 1 wherein the first ring is connected to the second ring by at least one spanning ring in which the directionality of the medium flow is configurable.

3. A network as described in Claim 2 wherein the nodes of each ring are connected by core links in which the directionality of the medium flow is configurable.

4. A network as described in Claim 3 wherein the nodes of each ring are configurable so as to serve simultaneously as both input sources of the transferred medium or output destinations of the transferred medium.

5. A network as described in Claim 4 wherein the links are bi-directional regarding the medium flow.

6. A network as described in Claim 5 wherein the medium includes data and wherein each node includes a processor for processing the data.

7. A network as described in Claim 5 wherein the medium includes fluid and wherein each node includes a pump for pumping the fluid.

8. A network as described in Claim 5 wherein the medium includes electricity and wherein each node includes a transmitter/receiver for flow of the electricity.

9. A network as described in Claim 5 wherein the medium includes photons (light energy/waves) and wherein each node includes a transmitter/receiver for flow of the said photons.

10. A network as described in Claim 5 wherein specified subset of nodes and links represent planar or multi-dimensional surfaces that facilitate the movement of objects in a multi-dimensional space from one location to another relative to both the sides of surfaces and relationships to nodes/links.

11. A network as described in Claim 5 wherein each core ring has associated spanning links that span to all other core rings, or some subset thereof, that according to any specified ordering of the core rings are some power of any integer k greater than or equal to 2 ``distant'' from said core ring.

12. A network as described in Claim 5 wherein each core ring has associated spanning links that span to some subset of all other core rings such that any node of a core ring can be linked to any other node of another core by means of a pre-determined number of hops to intermediate core rings.

13. A network as described in Claim 5 wherein nodes can be assigned to sub-rings of any prescribed sizes such that the sum of the sizes is less than or equal to the totality of nodes in the network and such that each sub-ring is disjoint regarding nodes and links from all other sub-rings.

14. A network as described in Claim 5 wherein nodes can be assigned to sub-rings of any prescribed sizes and regardless of any existing assignments of nodes/links to disjoint sub-rings a new additional sub-ring assignment can be made that is also disjoint from all existing sub-rings without modifying the existing assignments.

15. A network as described in Claim 5 wherein nodes can be assigned to sub-rings of any prescribed sizes and regardless of any existing assignments of nodes/links to disjoint sub-rings a new additional sub-ring assignment can be made that is also disjoint from all existing sub-rings with only a specified upper-bounded modification of the existing assignments.

16. A network as described in Claim 5 wherein nodes can be assigned to sub-rings of any prescribed sizes according to a specified criterion regarding the impact on existing assignments nodes/links relative to new additional assignments in the presence of some specified number of faulty nodes/links.

17. A recursive construction of the network as described in Claim 5 wherein each node in a core ring unto itself represents an embedded network as described in Claim 5.

18. A concatenated network comprised of the networks as described in Claim 5 wherein the nodes of the core rings of the

comprising networks also have spanning links to the nodes of other networks as described in Claim 5 according to specified binding patterns regarding network to network coverage and reachability.

19. A network as described in Claim 5 wherein each core ring has associated spanning links that span to some subset of all other core rings such that any node of a core ring can be linked to any other node of another core by means of a pre-determined number of hops to intermediate core rings and where each hop corresponds to a core ring to core ring distance that is a power of two.

20. A network as described in Claim 19 wherein each core ring has associated spanning links that span to some subset of all other core rings such that any node of a core ring can be linked to any other node of another core by means of a pre-determined number of hops to intermediate core rings and for which an algorithm to determine an appropriate combination of such hops can be based on a binary representation of the distance between the two core rings.

21. A network as described in Claim 11 wherein each wherein each core ring has associated spanning links that span to some subset of all other core rings such that any node of a core ring can be linked to any other node of another core by means of a pre-determined number of hops to intermediate core rings and for which an algorithm to determine an appropriate combination of such hops can be based on a function of k that expresses the distance between the two core rings.

22. A network as described in Claim 5 wherein the directionality of the medium flow over each of the links between nodes is pre-configured in terms of orientation.

23. A network as described in Claim 5 wherein the directionality of the medium flow over each of the links between nodes is pre-configured in terms of orientation and the nodes are partitioned into fixed categories according to whether they operate as conduits serving external devices as network input sources of medium and/or as network output destinations of medium.

24. A network as described in Claim 5 wherein the directionality of the medium flow over each of the links between nodes is pre-configured in terms of orientation and the nodes are partitioned into fixed categories according to whether they operate as conduits serving external devices as network input sources of medium and/or as network output destinations of medium and there is an orientation bias regarding input source to output destination medium flow.

25. A network as described in Claim 5 wherein the each node is associated with at least one other node which can serve as a back-up node regarding network reconfiguration so as to tolerate link and/or node failures.

26. A method for transferring a medium comprising the steps of:

receiving the medium at a first configurable port of a first processing element of an array from a first external device;

transmitting the medium from a second configurable port of the first processing element to at least a first configurable port of a second processing element of the array over a first configurable link between the second configurable port of the first processing element and the first configurable port of the second processing element;

sending the medium from a second configurable port of the second processing element to a second external device;

receiving the medium from the second external device at a first configurable port of a third processing element of the array; and

transmitting the medium from a second configurable port of the third processing element to at least a first configurable port of a fourth processing element of the array over a second configurable link between the second configurable port of the third processing element and the first configurable port of the fourth processing, wherein each processing element is disposed in the array at a same location and each processing element of the array has multiple configurable links with at least two other processing elements of the array.